7100 - SOIL RESOURCE MANAGEMENT

Table of Contents

7100 - SOIL RESOURCE MANAGEMENT

7110 - MULTIPLE-USE COORDINATION

7120 - SOIL CLASSIFICATION AND MAPPING (RESERVED)

7130 - APPLICATION OF SOIL INVENTORY INFORMATION (RESERVED)

7140 - (UNASSIGNED)

7150 - WATER MANAGEMENT

7160 - (UNASSIGNED)

7170 - EROSION CONTROL

7180 - DISTURBED AREA RESTORATION

7190 - EROSION (RESERVED)

7100 - SOIL RESOURCE MANAGEMENT

.01 Purpose. This Manual Section defines the policies of the Bureau of Land Management's (BLM) Soil Resource Management Program with specific emphasis on the conduct of soil surveys and their related functions.

.02 Objectives. The Soil Resource Management Program is designed to provide guidance to managers and resource specialists to:

A. Prevent impairment of soil productivity due to accelerated soil loss or physical or chemical degradation of the soil resource.

B. Ensure that Bureau management actions and objectives are consistent with soil resource capabilities.

.03 Authority. The Soil Resource Management Program is conducted under these major authorities, Executive Orders, and Memoranda of Understanding (MOU). (See Manual Section 7000.03.)

A. Desert Land Act of 1977, as amended, Chapter 107, 19 Stat. 377 (43 U.S.C. 321 et seq.; March 3, 1877).

B. Economy Act of 1932, as amended, P.L. 72-211, 47 Stat. 417 (31 U.S.C. 686; June 30, 1932).

C. Taylor Grazing Act of 1934, as amended, P.L. 73-482, 48 Stat. 1269 (43 U.S.C. 315; June 28, 1934).

D. Soil Conservation and Domestic Allotment Act of 1935, as amended, P.L. 74-46, 49 Stat. 163 (16 U.S.C. 590; April 27, 1935).

E. Revested Oregon and California Railroad and Reconveyed Coos Bay Wagon Road Grant Lands Act of 1937, as amended, P.L. 75-405, 50 Stat. 874 (43 U.S.C. 1181; August 28, 1937).

F. Soil Information Assistance for Community Planning and Resource Development Act of 1966, P.L. 89-560, 80 Stat. 706 (42 U.S.C. 3271 et seq.; September 7, 1966).

G. Federal Land Policy and Management Act of 1976, as amended, P.L. 94-579, 90 Stat. 2743 (43 U.S.C. 1701 et seq.; October 21, 1976).

H. Surface Mining Control and Reclamation Act of 1977, P.L. 95-87, 91 Stat. 445 (30 U.S.C. 1201 et seq.; August 1977).

I. Soil and Water Resources Conservation Act of 1977, P.L. 95-192, 91 Stat. 1407 (16 U.S.C. 2001 et seq.; November 8, 1977).

J. Public Rangelands Improvement Act of 1978, P.L. 95-514, 92 Stat. 1803 (43 U.S.C. 1901 et seq.; October 25, 1978).

K. Farmland Protection Policy Act of 1981, Title XV, Subtitle I of P.L. 97-98, 95 Stat. 1341 (7 U.S.C. 4201 et seq.; December 22, 1981).

L. Executive Order 11514, March 5, 1970.

M. Executive Order 11611, February 8, 1972.

N. Memorandum of Understanding between the BLM, U.S. Department of the Interior, and the Soil Conservation Service (SCS), U.S. Department of Agriculture (USDA), Relative to the Making of Soil Surveys on Lands Administered by the Bureau of Land Management, July 8, 1978.

.04 Responsibility. (See Manual Section 7000.04.)

.05 References.

A. Manual Section 7000.

B. National Soils Handbook (NSH), USDA-SCS, 430-VI-NSH, issued July 1983. The NSH serves as a technical supplement to this Manual Section, providing operational procedures for the National Cooperative Soil Survey (NCSS) program. References to specific portions of the NSH appear throughout this Manual Section.

C. Soil Survey Manual (SSM), USDA Handbook No. 18, issued August 1951, and amendments. The SSM serves as a technical supplement to this Manual Section, providing the major principles and concepts for making and using soils surveys and the standards and conventions for describing soils. References to specific portions of the SSM appear throughout this Manual Section.

.06 Policy. It is the policy of the BLM to:

A. Collect and maintain soil resource information at a level of intensity consistent with management needs and in accordance with the NCSS program.

B. Develop, test, and apply soil interpretations to guide the use and management of the soil and related resources.

.07 National Cooperative Soil Survey (NCSS). The Bureau is a member agency of the NCSS program. The NCSS program is a joint effort of cooperating Federal agencies, land-grant universities, and other State and local agencies to describe, classify, map, interpret, and promote the use of soil information. The Bureau recognizes and adopts NCSS standards for the collection and interpretation of soils data. This strengthens the Bureau's soil program, but carries with it the responsibility to actively participate in NCSS efforts to develop, test, and update standards to ensure that Bureau needs are adequately addressed.

7100 - SOIL RESOURCE MANAGEMENT

.1 Soil Resource Management Program. The BLM's Soil Resource Management Program is administered as part of the Soil, Water, and Air Management activity.

.11 Function. The Program has two distinct, though closely related, functions.

A. Watershed Management. Soil and water are basic components of any watershed. Accordingly, soil scientists and hydrologists provide disciplinary expertise for sound watershed management on the public lands.

B. Support Services. The Soil Resource Management Program also provides support services to other resource activities. These are called basic soil services. Such service provides support to other resource activities that include advice, counsel, onsite evaluations, and specialized studies. More specific information about basic soil services is covered in the NSH, Section 600.03-9.

.2 Soil Survey. Soil survey is not simply soil mapping. It is the systematic examination, description, classification, mapping, and interpretation of the soil resource in a given geographic area. Effective and efficient management of Bureau-administered lands depends on the reliability and timeliness of such information.

.21 Operations Management. To identify soil resource information needs, to coordinate BLM activities with other members of the NCSS program, and to assure a smooth flow of work, cooperative efforts must be accomplished at the national, regional, State, and District levels.

A. National Level.

1. The National Long-Range Soil Survey Plan is developed and maintained in the BLM Headquarters Office. It shows the status of soil survey work on Bureau-administered lands and identifies future data needs and Bureauwide priorities. The Plan aids in the budgeting of funds and the scheduling of work for the efficient and orderly completion of soil survey on all Bureau-administered lands.

2. National soil survey work-planning conferences are held in odd-numbered years to discuss and resolve issues of national concern to the NCSS program. (See NSH, Section 600.03-1.) A Bureau representative serves as a permanent member of the conference steering committee.

3. A national MOU between the BLM and the SCS guides the actions of each agency in the conduct of cooperative soil survey work on Bureau-administered lands.

B. Regional Level.

1. Regional soil survey work-planning conferences are held in even-numbered years to discuss and resolve issues of regional concern to the NCSS program. One Bureau representative from each of the 11 Western States (Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming) and one representative from the Denver Service Center (DSC) serve as voting members of the Western Regional Conference. (See NSH, Section 600.03-2.) Bureau representatives to other regional conferences are recommended by the Headquarters Office as deemed necessary.

C. State Level.

1. The State Long-Range Soil Survey Plan is developed and maintained in the State Office. It shows the status of soil survey on Bureau-administered lands within the State and identifies future data needs and statewide priorities. The Plan aids in the budgeting of funds and the scheduling of work to meet management objectives. (See NSH, Section 600.03-3.)

a. Determining Priorities. Priorities for soil surveys within the State are determined by the State Director. The following factors should be considered in setting priorities:

(1) Information needs in support of the Bureau Planning System.

(2) Baseline data needs for monitoring studies.

(3) Other proposed or anticipated actions where soil-related effects, influences, or impacts will be analyzed.

b. Scheduling Soil Survey Work. As a NCSS cooperator, the BLM must coordinate soil survey activities with the SCS to maintain uniform workflow through the publication stage. (See NSH, Sections 601.04-5 and 601.04-6.) The Computer Aided Scheduling of Published Soil Surveys (CASPUSS) system is designed to compile schedules and standardize the administrative data necessary to coordinate the NCSS program. (See NSH, Exhibits 601-1 and 601-2.)

2. State soil survey conferences are held annually to discuss and resolve issues of statewide concern to the NCSS program. The Bureau is represented by the State soil scientist or a qualified designee. This conference provides an opportunity to review the State long-range plan (see .21C1) and to coordinate soil survey work schedules in support of the Bureau's annual work planning process.

3. A State-level MOU should be developed among the appropriate cooperators, generally the BLM, the SCS, and the State Agricultural Experiment Station. This agreement defines the general responsibilities of each cooperator for all soil surveys on Bureau-administered lands within the State. (See NSH, Section 601.02-1(a).)

4. A survey area MOU (work plan) must be developed for each soil survey area containing Bureau-administered land. This work plan may take the form of an annual amendment to the State-level MOU (see .21C3) or a separate MOU. In either case, included are the purpose of the survey, specific design criteria, desired interpretations, and a detailed definition of responsibilities regarding publication, interim reports, quality control, and any cost reimbursement provisions. This work plan should be prepared in close cooperation with the District staff. (See NSH, Section 601.02-1(b).)

D. District Level. A workload analysis should be prepared by the District staff, prior to developing a survey area MOU. This analysis should include a determination of acres to be mapped, personnel available for mapping, additional mapping personnel needs, time requirements for other resource specialists (e.g., range, wildlife, forestry, engineering), vehicle and other equipment needs, etc. The actual procedure and format for the analysis is determined by the State and District staffs. Guidance is given in NSH, Sections 601.04-1 and 601.01-2; although, any method that gives the desired results is acceptable.

.22 Soil Classification and Mapping. The primary objective of any soil survey is to provide reliable soil resource information consistent with the purpose of the survey. To help meet this objective, an experienced soil scientist must serve as the Contracting Officer's Authorized Representative (COAR) on all contract soil surveys. In addition, all soil surveys on Bureau-administered lands must meet the technical standards of the NCSS program.

A. National Cooperative Soil Survey. Standards and procedures for classifying and mapping soils are set forth in the following publications:

1. Soil Taxonomy (USDA Handbook 436, December 1975) and amendments. This publication provides the common base for the organization of knowledge about soils and the standards for their grouping into taxonomic classes. (See NSH, Section 602.00-1.)

2. Soil Survey Manual (USDA Handbook 18, August 1951) and revisions. This Manual provides the fundamental principles and the general procedures for making soil surveys. (See NSH, Section 602.00-2.)

3. National Soils Handbook. The NSH provides policy and procedures for carrying out the NCSS program. (See NSH, Part 600.00, Sections 600.01 and 602.00-3.)

B. Survey Design. Each soil survey must be designed to meet the needs of the users. This requires a knowledge of survey design alternatives and an awareness of management issues and concerns in the survey area.

1. Design Criteria. There are four major attributes of a survey that can be manipulated to meet specific management needs. (See NSH, Section 602.01-5.)

a. Kinds of Mapping Units. There are three main kinds of mapping units used in surveys on Bureau-administered lands. Consociations are dominated by a single component, while associations and complexes have two or more dominant components. (See Glossary of Terms for more detailed definitions.)

b. Components of Mapping Units. Mapping unit components are identified as either soil taxa or miscellaneous areas. Soil taxa are named at some level of soil taxonomy (i.e., Order, Suborder, Great Group, Subgroup, Family, Series). Miscellaneous areas (e.g., badland, rock outcrop) have little or no identifiable soil or have some highly unfavorable attribute which would override most use and management options. The choice of components and the level at which soil taxa are named depends on the use of the survey data. Normally, the soil series will be the basic taxon mapped on Bureau-administered lands. Phases of series will be the most common component of mapping units. Written approval from the Headquarters Office must be obtained prior to establishing a mapping legend which primarily utilizes any category above the series level.

c. Field Procedures. Specific field procedures determine the precision with which the composition of mapping units is described and the accuracy of the mapping unit boundaries. There are four basic procedures: transect, traverse, observation, and air photo interpretation. (See Glossary of Terms for detailed definitions.)

d. Map Scale. The chosen map scale dictates the smallest unit that can be delineated on the map. Generally, this is a 1/4 x 1/4 inch square or a circular area of 1/16 square inch. In practice, this is the smallest unit around which a line can be drawn in which a symbol can be placed. (See SSM, Chapter 2, pages 2-15.)

2. Standard Orders of Intensity. There are five standard orders of soil survey intensity, each defined in terms of the four design criteria listed above (see .22B1). An Order 3 survey is the approved level of intensity for most Bureau-administered rangelands. Surveys of greater or lesser intensity may be conducted on specific sites depending upon resource values and the level of detail needed for management decisionmaking. The characteristics of each level of intensity are given in SSM, Chapter 2, pages 2-14.

C. Quality Control. Soil correlation is a quality control process to ensure that kinds of soil are adequately defined, accurately mapped, and uniformly named in all soil surveys. In practice, the correlation process may be divided into two parts, informal and formal.

1. Informal Correlation. The informal portion involves day-to-day quality control efforts and is the primary responsibility of the survey party leader. Informal correlation also includes periodic field reviews to assist the party leader. In areas consisting of predominantly Bureau-administered land, the Bureau is responsible to ensure that specific provisions of the soil survey work plan, including Field reviews, are carried out. Individual agency responsibilities in the Field review process must be defined in the work plan (see .21C4).

2. Formal Correlation. There are two steps to formal correlation, the field correlation (usually combined with the final Field review) and the final correlation. Formal correlation can be greatly simplified by a conscientious, informal correlation effort throughout the survey. In all survey areas, regardless of land ownership or administration, the SCS is responsible for formal correlation. Cooperative planning and scheduling of correlation and related activities are essential for the SCS to carry out this responsibility in a timely manner. (See NSH, Section 602.004(b)(2).)

.23 Soil Interpretations. Soil interpretations are predictions of soil behavior or soil suitability for specific land uses or management practices. They do not preclude management actions, but rather provide a manager with a reasonable guide to the risks, limitations, and probable outcome of a particular use or practice. The level of intensity of soil mapping and the design of soil map units determine the kind of soil interpretations that can logically be made. Interpretations can be no more specific than the degree of map unit refinement and the displayed mapping detail. Accordingly, interpretive needs should be identified prior to initiation of extensive soil mapping (see .21D). Data for site-specific interpretations are better obtained through onsite evaluations (see .3), since a suitable mapping intensity over an entire survey area would be impractical.

A. Standard Interpretations. Several different soil interpretations have been formally developed, tested, and approved for application through the NCSS program. They appear in NSH, Tables 603-10 through 603-43. These interpretations, when applicable, should be used Bureauwide. Any revision of standard interpretations must be approved in writing by the Headquarters Office.

B. New Interpretations. Additional interpretations not provided for in the standard list (see .23A) are needed for rangeland and forestland applications. Examples include soil interpretations for mantle stability (landslide hazard), prescribed burning, rangeland seeding, use of specialized equipment, fence construction, wildfire rehabilitation, grazing systems, unsurfaced roads, plantability of tree seedlings, and Desert Land Entry (DLE) clearances.

1. Initiation. The need for new interpretations is often identified at the District or Resource Area level, though may originate at any level. The initial step is to select preliminary soil criteria that relate to the use or practice in question. Criteria consist of specific soil properties and rating classes. These criteria are based on professional judgment and any pertinent technical guides or other available information from the BLM; other Federal, State, or local agencies; universities; professional societies; and scientific literature. The source and rationale for criteria must be documented as part of the interpretation. Preliminary interpretations are then submitted to the appropriate State Office(s) for testing and coordination.

2. Testing and Coordination. Testing consists of evaluating the specific criteria for adequacy and verifying the rating classes against actual field observations and any available records on the results of similar actions. Specific assignments should be made for testing (e.g., District soil scientists, DSC soil scientists) and the responsibilities programmed and tracked through the annual work plan process. This ensures timely completion of testing. To establish broad credibility for a new interpretation, other resource specialists from within the BLM and from participating NCSS agencies in the State should be consulted for review and for any available data by which to evaluate the new interpretation. The State Director or designee is responsible for this coordination during the testing phase.

3. Preparation of Final Interpretation. When testing is completed and all comments, suggestions, and test results assembled, a final interpretation is prepared. This may be accomplished by the appropriate State Office staff specialist or by any other individual or group appointed by the State Director. Each new interpretation must include the following elements:

a. Assumptions. (See NSH 603.03-3(d)(1) for example.)

b. References (pertinent sources of information in support of interpretation criteria).

c. Criteria (soil properties and rating classes). (See NSH Table 603-24 for example.)

d. Explanation of rating classes. (See NSH 603.03-3(e)(2) for example.)

4. Approval. When the final interpretation has been prepared, it must be approved in writing by the State Director or designee prior to extensive application. Once approved, the interpretation becomes a State supplement to this Manual Section (i.e., 7100). Other States, upon written approval by the appropriate State Director or designee, may adopt the interpretation for use. Coordination among States should preclude major differences in the same or similar interpretations. However, if two or more States approve interpretations for the same use or practice that contain different soil properties, have different rating classes, or otherwise different, the Headquarters Office shall have final authority to require modifications if deemed necessary.

5. Distribution of Interpretations. Following approval of new interpretations, they shall be distributed as follows:

a. Washington Office (WO-200).

b. Denver Service Center (D-400).

c. All State Directors.

d. All District Managers (within approving State).

e. State Soil Scientist, SCS (within approving State).

f. Principal Soil Correlator, SCS National Technical Center, Portland, Oregon.

.24 Survey Investigations. Soil survey investigations are made in support of the soil survey. They provide information on chemical and physical soil properties needed for characterization, interpretation, and classification. (See NSH, Part 604.) Laboratory support needs should be addressed in the survey area MOU (see .21C4).

.25 Survey Reports.

A. U.S. Department of Agriculture Series. The SCS has responsibility for publishing soil survey reports for the NCSS program as part of a formal USDA publication series. Guidelines for the publication of surveys on lands administered by Federal agencies are given in NSH, Section 605.10. Specific agency responsibilities for manuscript preparation and related duties should be addressed in the survey area MOU (see .21C4).

B. Interim Reports. Prior to publication of a final survey report, the BLM may use or publish interim information as required, for within Bureau use. Where the SCS or other agency is conducting a survey on Bureau-administered lands, the need for interim information should be clearly documented in the survey area MOU (see .21C4). Interim publications should give appropriate credit to other agencies involved in making the survey. (See NSH, Section 605.08(b).)

.3 Onsite Evaluations. Most soil surveys on Bureau-administered lands are conducted at an Order 3 level of intensity. This level is adequate for general planning purposes but is not sufficient for site-specific planning, analyses, or project design (e.g., water developments, erosion control structures, road locations, vegetation manipulations, DLE applications). In such cases, onsite evaluations are conducted by soil scientists to evaluate specific soil properties and site characteristics important for project success and to aid in determining design criteria, associated cost factors, and potential problems or hazards.

.31 Reports. The results of onsite evaluations may be reported informally (oral communication) or in formal written reports.

A. Required Reports. Formal written reports are required whenever the proposed action involves:

1. A legal appeal or litigation or where such action is expected.

2. Estimated project costs that exceed $1,000.

3. The potential for serious environmental damage or safety hazards either onsite or offsite.

B. Report Format. Formal written reports will contain the following information as a minimum:

1. Name and title of evaluator.

2. Date of evaluation.

3. Location.

4. Purpose.

5. Procedures or techniques employed.

6. Findings (e.g., observations, revised or more detailed soil map).

7. Applicable alternatives (if appropriate).

8. Conclusions and/or recommendations.

C. Environmental Analysis. Recommendations or conclusions that result from an onsite evaluation shall become a part of any environmental analysis document.

7100 - SOIL RESOURCE MANAGEMENT

.4 Soil Information Systems. (Reserved)

.5 Training and Career Development. (Reserved)

7100 - SOIL RESOURCE MANAGEMENT

Glossary of Terms

-A-

association, soil: a group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

air photo interpretation: plotting boundaries and estimating composition of delineations based on air photo features that have been related to soils and landscape features.

-C-

climax vegetation: the stabilized plant community on a particular site. The plant cover reproduces itself and does not change as long as the environment remains the same.

complex, soil: a map unit of two or more kinds of soils in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

consociation, soil: a map unit in which one kind of soil or a kind of miscellaneous area dominates each delineation.

-O-

observation: visual checking of landscape features, exposed geological formations, or change exposures of pedons from within or without a delineation to project boundaries and composition from previously determined relations; air photos may be used as guides. This is a less intensive operation than traversing.

-P-

productivity, soil: the capacity of a soil for producing a specified plant or sequence of plants under specific management.

-R-

rangeland: land on which the potential natural vegetation is predominately grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

range site: an area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

-S-

soil: the collection of natural bodies on the Earth's surface, in places modified or even made by man of earthy materials, containing living matter and supporting, or capable of supporting, plants out of doors. Soil is a natural medium for the growth of land plants, whether or not it has discernible soil horizons.

soil classification: the systematic arrangement of soils into groups or categories on the basis of their characteristics. Broad groupings are named on the basis of general characteristics, and subdivisions on the basis of more detailed difference in specific properties.

soil management: all activities in soil identification, classification, and interpretation of soil behavior (potential and limitations) related to land use and the sum total of all land treatments, soil productivity, and other special treatments conducted on a soil.

soil survey: A field investigation resulting in a soil map showing geographic distribution of different kinds of soil and an accompanying report that describes, defines, classifies, and interprets for use the different kinds of soil. The interpretations predict how the soil behaves for different uses and responds to various management systems.

-T-

transect: (1) The field procedure of crossing delineations or landscape units along selected lines to determine the pattern of polypedons with respect to landforms, geologic formations, or other observable features. (2) Identifying pedons at regular spaced intervals (i.e., gridding).

traverse: validation of the predicted boundaries or composition of a delineation by entering it or crossing it and identifying pedons at selected or random positions.